RESOLUTION 2019-028: GREAT LAKES HYPERLOOP: CONTRACT AMENDMENT

NOACA Board of Directors
June 14, 2019

ACTION REQUESTED

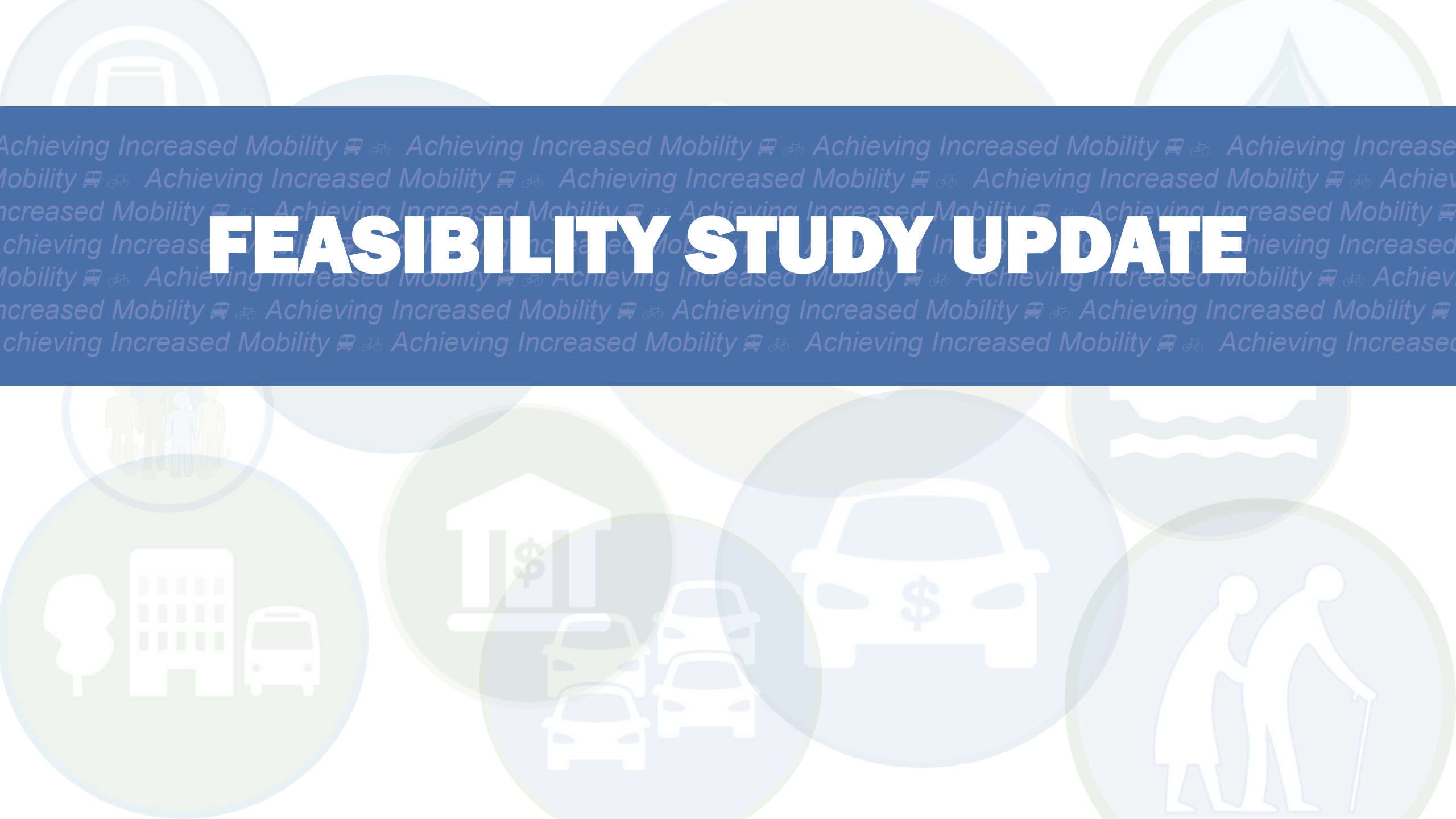
Request that the Board of Directors adopt the following resolution

- Resolution 2019-028, which will amend the Transportation Economics & Management Systems, Inc. (TEMS) contract for the Great Lakes Hyperloop Feasibility Study in the amount of $35,393; and extend the contract term to October 31, 2019

PREVIOUS ACTION

Resolution 2018-019 awarded a contract to TEMS for the development of the Great Lakes Hyperloop Feasibility Study

FEASIBILITY STUDY UPDATE



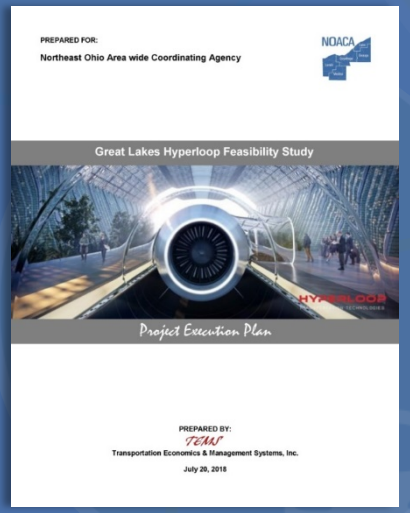
PROJECT SCOPE

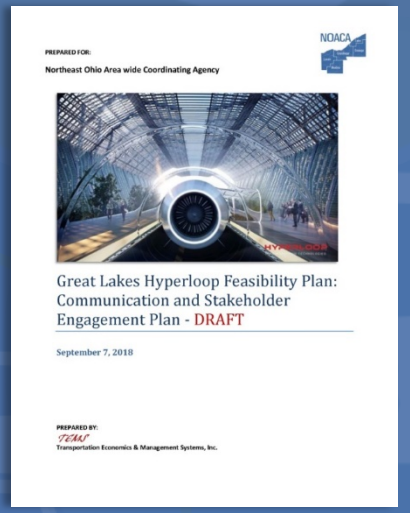
Four Phases

- Project Objectives and Organization
- Site Reconnaissance and Preliminary Route Analysis
- Technical and Financial Feasibility
- Project Development Cost and Schedule

PHASE 1: PROJECT OBJECTIVES AND ORGANIZATION

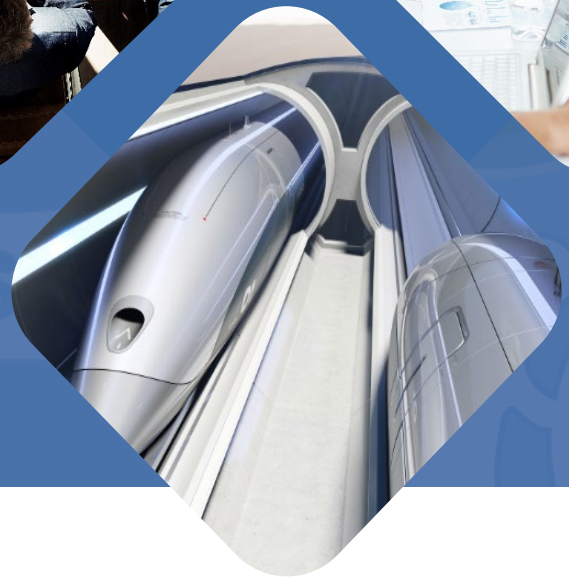
Project Execution Plan
Communications and Stakeholder Engagement Plan





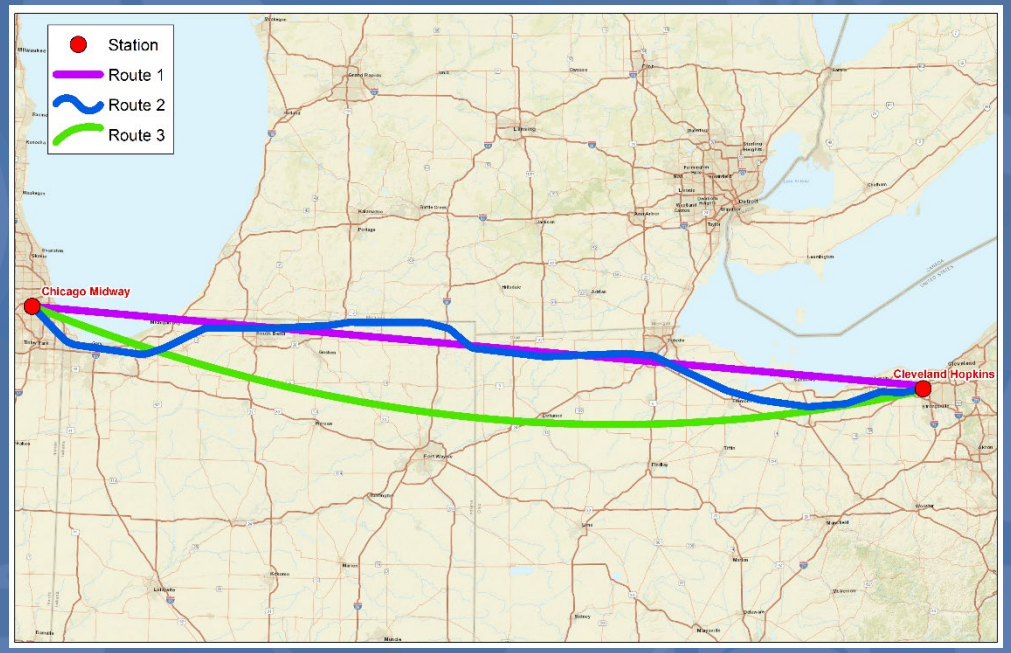
ABOUT THE PROCESS

- We will use the Communication & Stakeholder Engagement Plan to educate our stakeholders about the Hyperloop System.
- NOACA will fully develop outreach activities as part of a comprehensive public involvement process.
- Seek the assistance of several MPOs, government and public organizations located within the project corridor to carry out these activities.

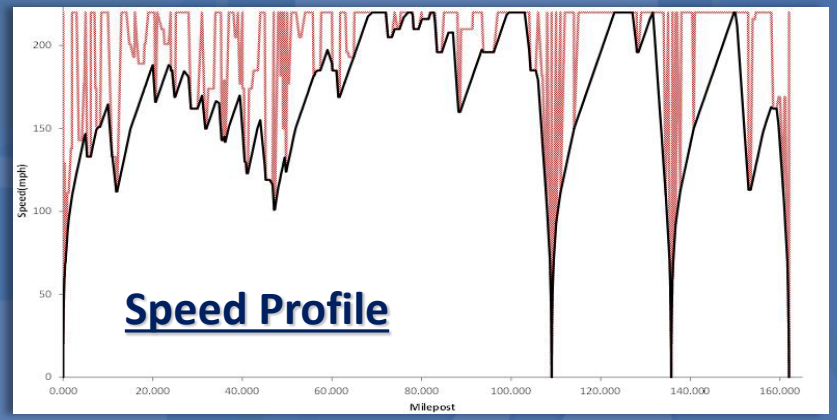


PHASE 2: SITE RECONNAISSANCE AND PRELIMINARY ROUTE ANALYSIS

TRACKMAN™ identified the capital costs for each route.



TRACKMAN™ and LOCOMOTION™ assessed the speed of Hyperloop technology along different routes.



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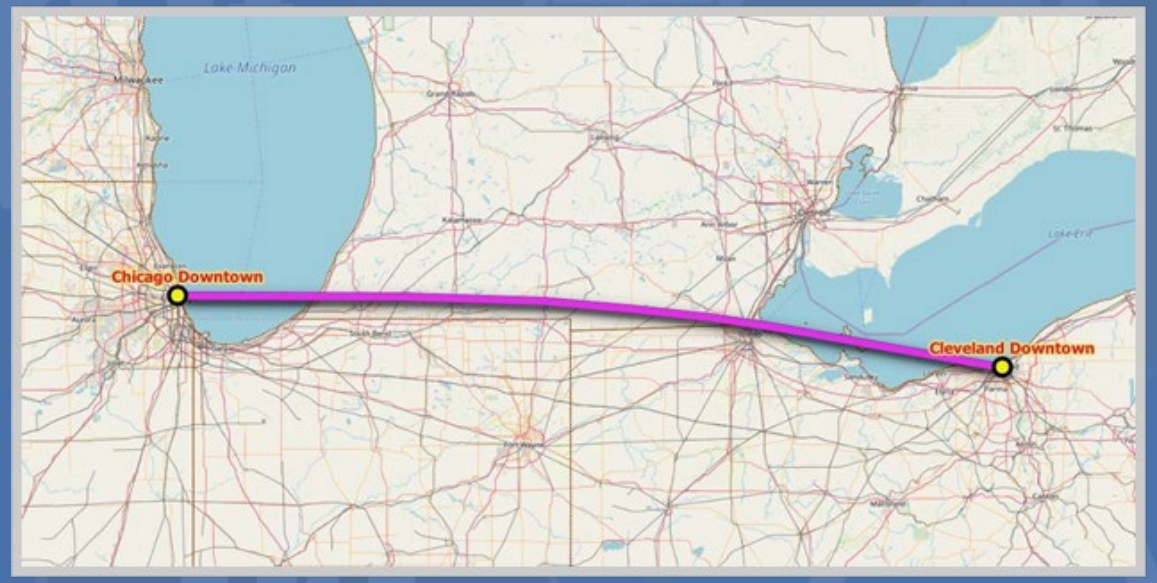
PHASE 2: SITE RECONNAISSANCE AND PRELIMINARY ROUTE ANALYSIS



Alternative 1 – Connects Cleveland with Chicago on as close to a straight line as possible. This includes two sections of alignment underneath the lakes.

PHASE 2: SITE RECONNAISSANCE AND PRELIMINARY ROUTE ANALYSIS

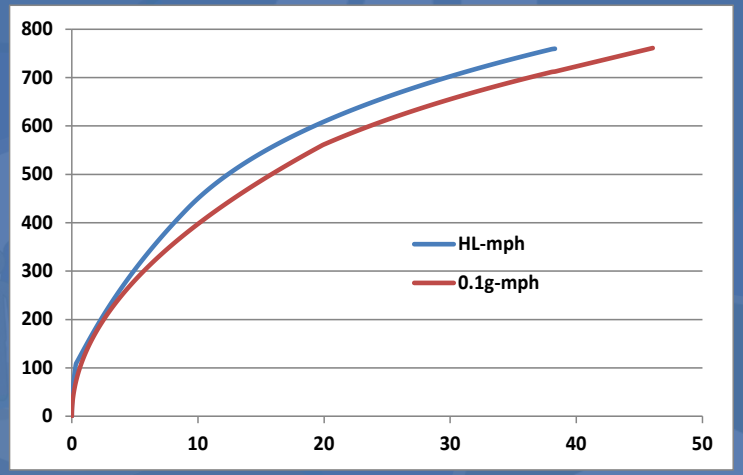
Alternative 2 – Originally utilized the existing highway alignment, but it proved to be too curvy for Hyperloop. A new alignment was developed following the Ohio and Indiana Turnpikes, but not confined to the geometry of the existing highway.

PHASE 2: SITE RECONNAISSANCE AND PRELIMINARY ROUTE ANALYSIS

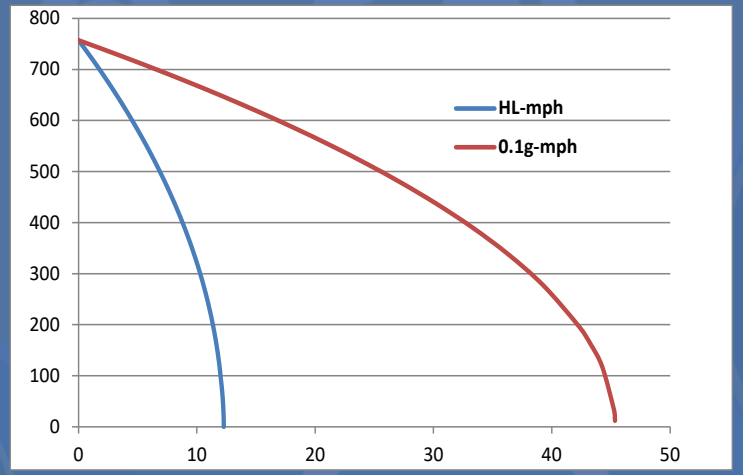
Alternative 3 –This proposed route would utilize several sections of very straight existing rail and highway segments as well as new alignment.

PHASE 2: SITE RECONNAISSANCE AND PRELIMINARY ROUTE ANALYSIS

Acceleration



Braking



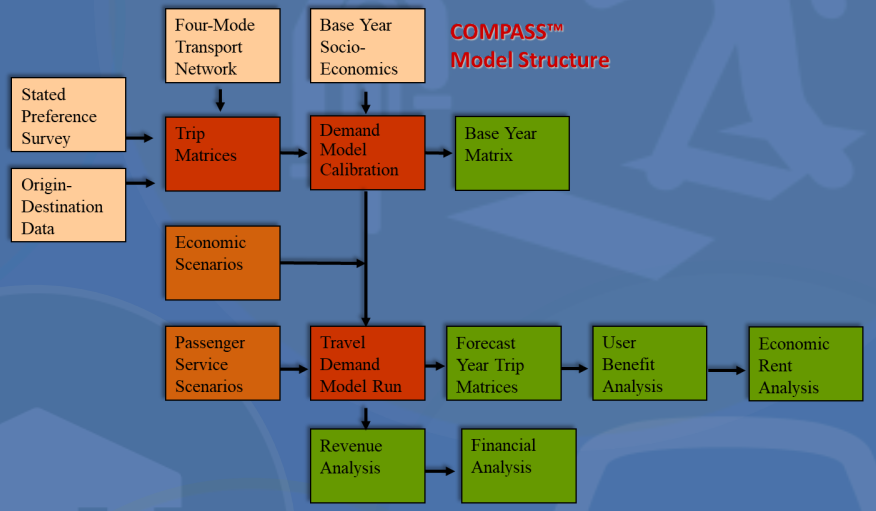
0.1g max acceleration/braking rate

PHASE 3: TECHNICAL AND FINANCIAL FEASIBILITY

Financial Analysis

Thousands of 2006 $	Total to 2040	2012	2013	2014	2015	2016	2017
Revenues							
Ticket Revenue	**$1,080,230**	$13,567	$25,107	$28,659	$29,422	$30,185	$30,948
On Board Services	**$86,418**	$1,085	$2,009	$2,293	$2,354	$2,415	$2,476
Express Parcel Service (Net Rev)	**$54,011**	$678	$1,255	$1,433	$1,471	$1,509	$1,547
Total Revenues	**$1,220,660**	$15,331	$28,371	$32,385	$33,247	$34,109	$34,971
Train Operating Expenses							
Energy and Fuel	**$75,081**	$2,013	$2,013	$2,013	$2,013	$2,013	$2,013
Train Equipment Maintenance	**$204,890**	$5,494	$5,494	$5,494	$5,494	$5,494	$5,494
Train Crew	**$96,367**	$3,323	$3,323	$3,323	$3,323	$3,323	$3,323
On Board Services	**$80,631**	$1,833	$2,295	$2,437	$2,467	$2,498	$2,528
Service Administration	**$147,171**	$5,075	$5,075	$5,075	$5,075	$5,075	$5,075
Total Train Operating Expenses	**$604,139**	$17,738	$18,200	$18,342	$18,372	$18,403	$18,434
Other Operating Expenses							
Track & ROW Maintenance	**$114,663**	$3,954	$3,954	$3,954	$3,954	$3,954	$3,954
Station Costs	**$40,547**	$1,398	$1,398	$1,398	$1,398	$1,398	$1,398
Sales & Marketing	**$51,009**	$643	$1,190	$1,358	$1,394	$1,429	$1,465
Insurance Liability	**$43,345**	$549	$1,015	$1,158	$1,188	$1,218	$1,248
Total Other Operating Expenses	**$249,564**	$6,544	$7,557	$7,868	$7,934	$7,999	$8,065
Total Operating Expenses	**$853,703**	$24,283	$25,757	$26,210	$26,306	$26,402	$26,498
Cash Flow From Operations	**$366,957**	($8,952)	$2,614	$6,175	$6,941	$7,707	$8,473
Operating Ratio	**1.43**	0.63	1.10	1.24	1.26	1.29	1.32

Market Analysis



Hyperloop Oriented Development

Cost Benefit Analysis

Benefits	Billions in 1998 dollars
MWRRS User Benefits	
Consumer Surplus	$6.4
(e.g., time savings expressed as dollars)	
System Revenues	$6.8
Other Mode User Benefits	
Airport Congestion Relief	0.7
Highway Congestion Relief	1.3
Resource Benefits	
Air Carrier Operating Cost Reductions	0.4
Emission Reductions	0.3
Total Benefits	$15.9
Costs	
Capital	$4.1
Financing	0.2
Operating and Maintenance	5.0
Total Costs	$9.3
Ratio of Benefits to Costs	1.7

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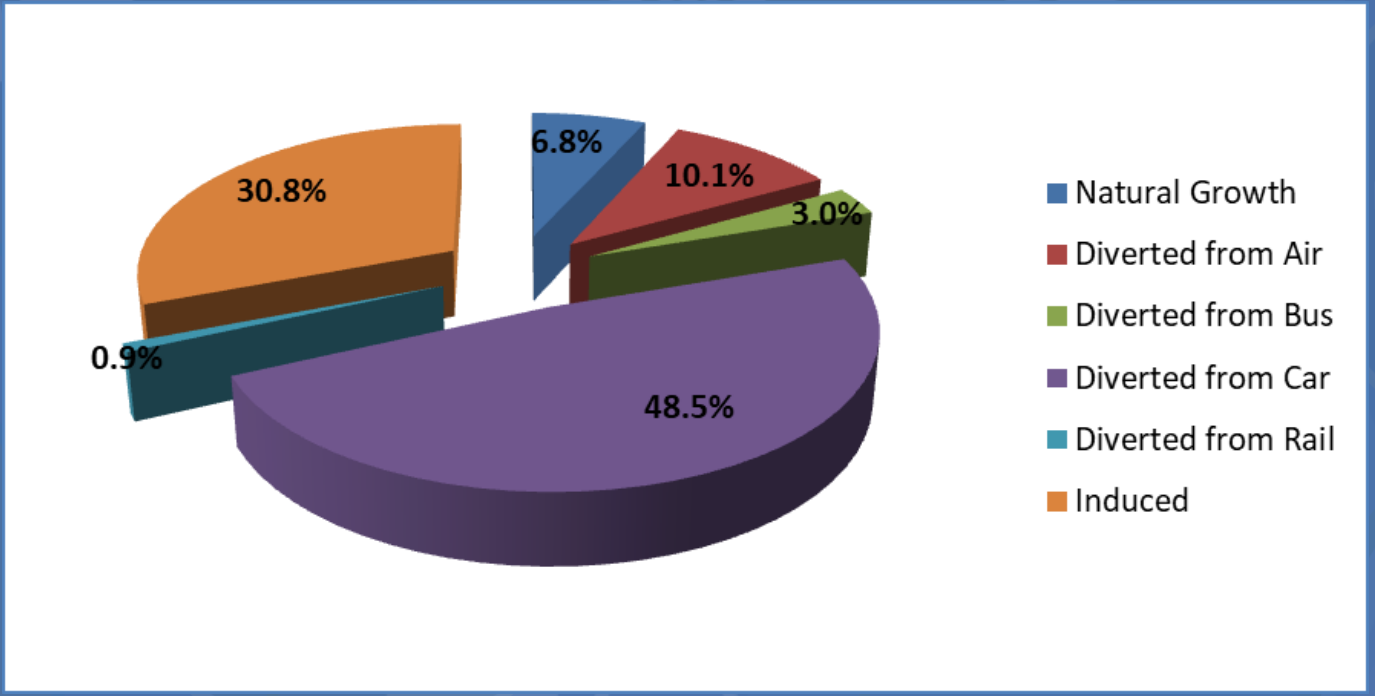
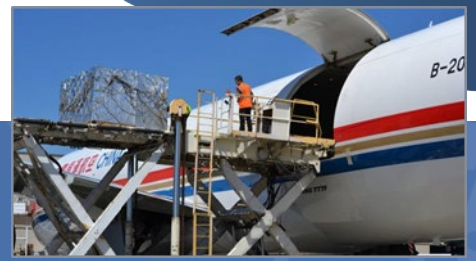
PHASE 3: TECHNICAL AND FINANCIAL FEASIBILITY

- Travel Purpose Shares for Each Option (2030)



PHASE 3: TECHNICAL AND FINANCIAL FEASIBILITY

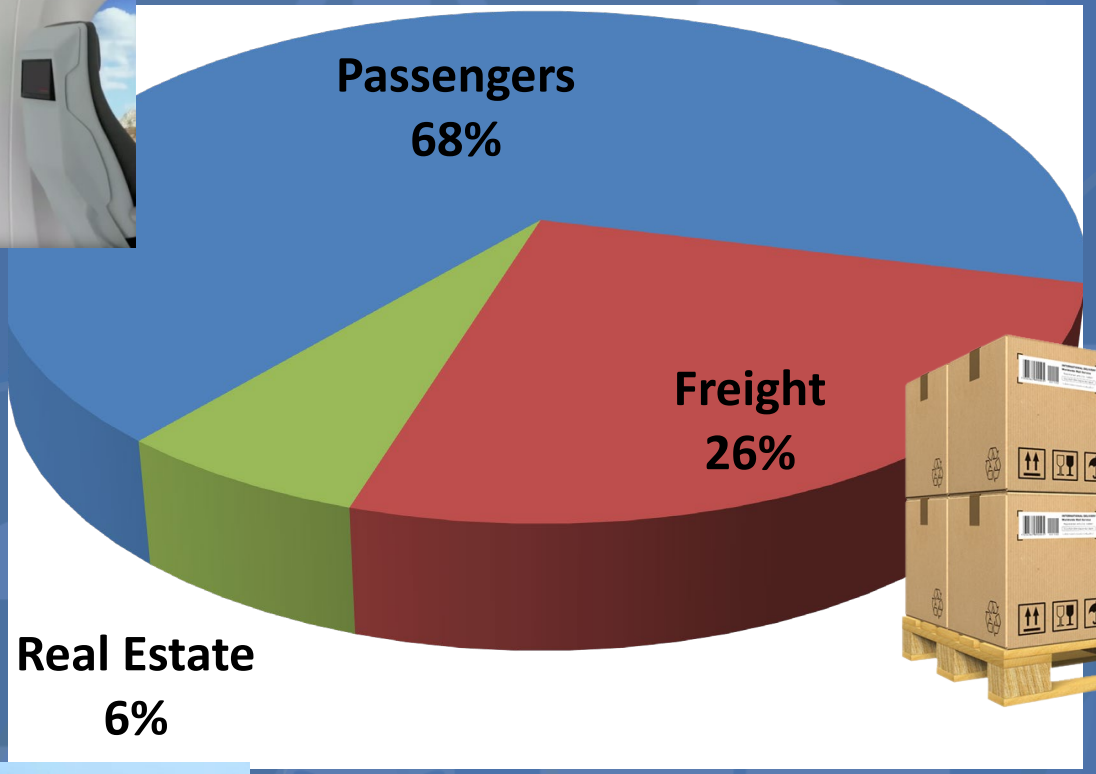
2030 Freight Revenue Market Shares



Forecast is for the Chicago-Cleveland Toll Road Option

PHASE 3: TECHNICAL AND FINANCIAL FEASIBILITY

2030 Total Passenger and Freight Revenue Market Share



Forecast is for the Chicago-Cleveland Toll Road Option

PHASE 3: TECHNICAL AND FINANCIAL FEASIBILITY

NET PRESENT VALUE CALCULATION

Net Present Value = Present Value of Total Benefits – Present Value of Total Cost

$$PV = \sum C_t / (1 + r)^t$$

Where:

PV = Present value of all future cash flows;

C_t = Cash flow for period *t*

r = Opportunity cost of money

t = Time

PHASE 3: TECHNICAL AND FINANCIAL FEASIBILITY

MEASURES OF RETURN

Operating Ratio (OR)

$$\frac{\text{NPV Revenue}}{\text{NPV Operating Cost}} > 1$$

Cost Benefit Ratio (BCR)

$$\frac{\text{NPV Benefits}}{\text{NPV Total Cost}} > 1$$

PHASE 3: TECHNICAL AND FINANCIAL FEASIBILITY

Benefit-Cost Analysis Results

- Alternative 2
- Year 2030

Passenger Operating Ratio	**1.95**
Overall Operating Ratio	**5.16**
Benefit-Cost Ratio	**1.49**

PHASE 4: PROJECT DEVELOPMENT COST AND SCHEDULE

- Conceptual Cost Estimate
- Design Build Readiness
- Project Schedule
- Project Implementation Strategies

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CONTRACT AMENDMENT

BACKGROUND

- NOACA and Hyperloop Transportation Technologies (HTT) formed an official Public Private Partnership (P3) on February 26, 2018
- Announced plans for the Great Lakes Hyperloop starting with a feasibility study from Cleveland to Chicago.

BACKGROUND

- **The Board of Directors, through Resolution 2018-019, awarded a contract to TEMS for the development of The Great Lakes Hyperloop Feasibility Study**
  - Budget amount not to exceed $600,000
  - Contract awarded $550,092
  - Began July 2, 2018 for a period of approximately 36 weeks
  - The study corridor was extended to Youngstown as requested by ODOT

BACKGROUND

Justification

- **The Cleveland to Pittsburgh corridor was always identified as a phase two route**
  - Youngstown to Pittsburgh extension (approximately 65 miles) will complete the network in phase one
- **In March 2019, the Pennsylvania Turnpike Commission awarded a two million dollar contract for a Hyperloop feasibility study from Pittsburgh to Philadelphia**
- **Enhances the economic feasibility and connects Cleveland to the East Coast through Pennsylvania's Hyperloop Feasibility Study**

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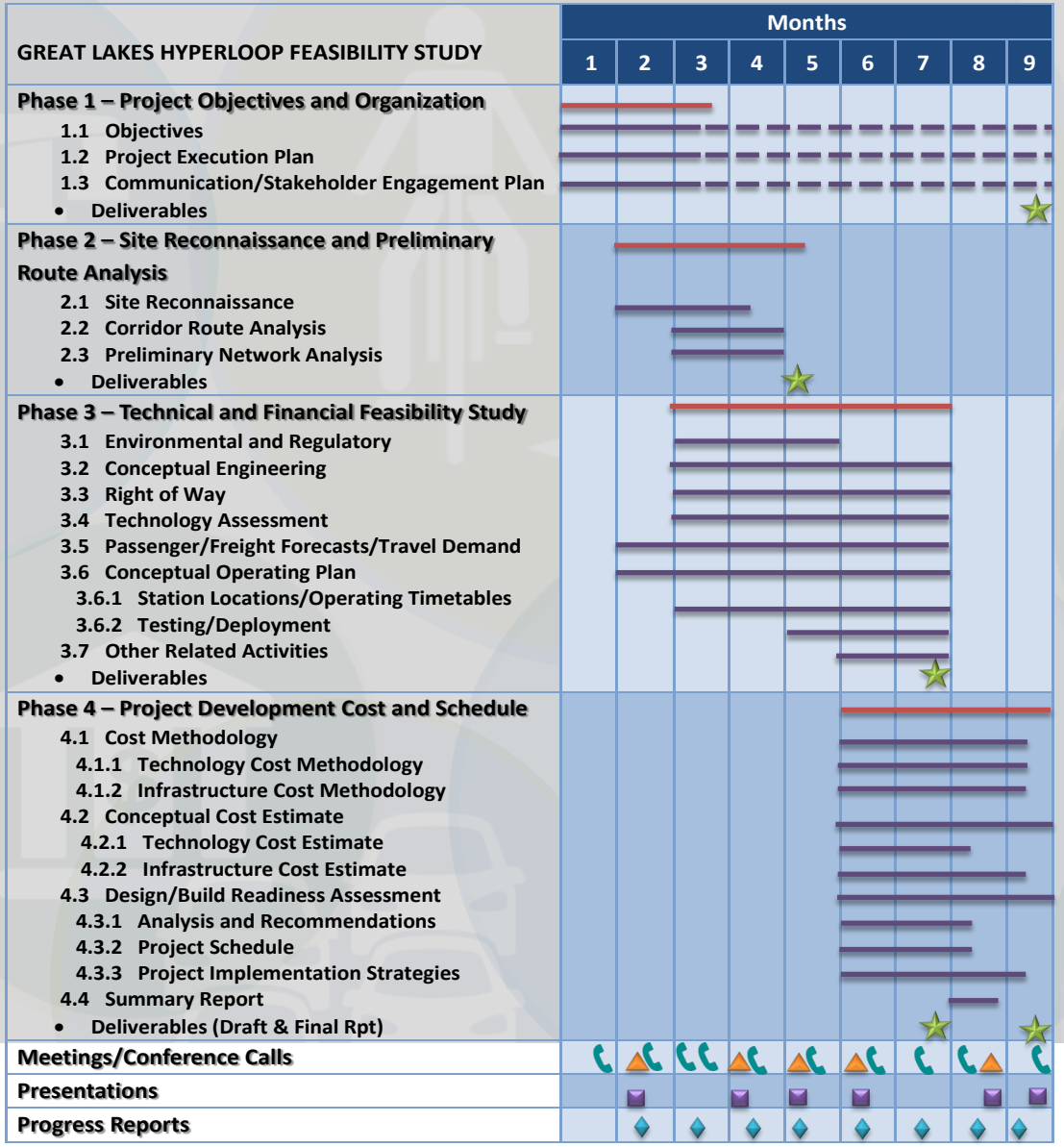
FINANCIAL IMPACT

Description	Amendment Amount	Contract Amount
Original TEMS Contract		$550,092
TEMS Contract Including Cleveland to Youngstown		$550,092
Reassignment of Outreach from TEMS to in-house	$19,757	
Additional Cost of Extension to Pittsburgh	$55,150	
Net Addition to TEMS Contract	$35,393	$35,393
Revised TEMS Contract Extended to October 31, 2019		$585,485

SCHEDULE

Pittsburg extension will require increase the schedule 3 months



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ACTION

Approval of Resolution 2019-028, which:

- Amend the Transportation Economics & Management Systems, Inc. (TEMS) contract for The Great Lakes Hyperloop Feasibility Study in the amount of $35,393, and extend the time of the contract through October 31st, 2019

Motion
Second
Discussion
Put the Question

NOACA will **STRENGTHEN** regional cohesion, **PRESERVE** existing infrastructure, and **BUILD** a sustainable multimodal transportation system to **SUPPORT** economic development and **ENHANCE** quality of life in Northeast Ohio.